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Summer Field Courses at the Audubon Nature Center

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The Audubon Nature Center is located eight miles from downtown Greenwich, Connecticut, and only 25 miles from the limits of New York City.

Operated by the National Audubon Society and directed by Mr. Charles E. Mohr, the Center comprises 280 acres of wooded hills, of fields, brushy pastures, swamps and streams, a lake and many woodland pools. Nearby is the Fairchild Garden, a 127-acre wildflower preserve, also operated by the Audubon Society.

The Audubon Nature Center operates on a year-round basis and serves as a community center for nature and conservation education and for recreation. For a ten-week period each summer, however, it becomes a training center for teachers and youth leaders from all over the country. With the aid of the director, staff, and expert consultants from federal, state, local and private agencies, the campers may plan a study unit or outline a curriculum, organize a conservation project or a school camping program.

My motive for attending one of the workshops was to discover new materials and new techniques for conservation studies in high school biology programs. I soon discovered that our studies were not to be limited to the Center, rich as its resources are. On the Daniel McKeon Farm near Ridgefield, we saw the most advanced soil and crop management practices. This struck us as being a Connecticut "Malabar Farm". When we studied water resources we visited New York's Kensico Reservoir, a few miles away. While this huge system sends three-quarters of a billion gallons to the metropolis daily, we saw types of settling basins and water supply treatment stations similar to those in most of our own communities.

Greenwich Point, on Long Island Sound, offered much in shore and tidepool life. We saw a dozen species of gulls, terns, and herons, including the American Egret and the Roseate Tern. Salt water swimming was a new experience for some of the campers, since they

A great windrow of kelp, on the shore of Long Island Sound, contains a rich collection of marine life. A swim in the Sound and a picnic on the beach highlight the trip.

had come from a dozen states, some far inland.

Prior to visits from the consultants, the director or other staff members familiarized the students with the day's problems. From my notebook:

Aug. 14: 8 A. M.—"What a Forester Does"—Mr. Mohr.

1. Paces distances accurately. 2. Measures height of trees. 3. Estimates board feet of lumber in trees. 4. Scales logs for lumber content.

Each step was begun with a demonstration and followed by a period in which everyone took part. By the time the campers were reasonably proficient in the four skills, State Forester Raymond Kienholz had arrived from Hartford to spend a day conducting field work and lectures.

Just back from a cross-country trip, Dr. Kienholz declared that the best cared for forests and parks are state or federal owned. "Few privately owned forest tracts are being handled in a manner likely to insure a continuous crop of timber."

Another consulant was Dr. C. L. W. Swanson, Chief Agronomist, Connecticut Agriculture Experiment Station. He defined *soil* as medium for plant growth; *dirt*, as matter out of place. Speaking of *hydroponics* or *nutriculture*, Dr. Swanson said, "It's working, but is not economically practical. It is more important to keep soil where it is and treat it than to try substitutes."

Dr. W. W. Reitz, Head of Educational Relations, U. S. Soil Conservation Service, Upper Darby, Pa., lectured on "Soil Conservation for the City." He declared that "fertile soil is the basic capital of any nation. We have depleted our soil faster than any other country. . . . Land belongs to society. Just because man holds the title should not give him reason for exploiting it." It was pointed out that while plastics are being used as substitutes for irreplaceable minerals, plastics originate in products of

the soil. Dr. Reitz outlined many projects which have proved effective in teaching conservation and showed how they could be fitted into the curriculum at many points.

Mr. Richard H. Pough, wildlife expert and author of *The Audubon Guide to Birds*, explained his method of censusing the bird and plant life at the Center. These studies are designed to document the relentless succession of plants in the gradual change from field to forest, and the inevitable changes in bird and animal life caused by the evolution of new plant communities.

Other consultants during the two-week workshop period included officials of the State Water Commission and the State Department of Health.

While the six "guest" lecturers presented the professional viewpoints, members of the regular Center staff, conducted most of the classes and each day integrated the demonstrations, lectures, and field trips with the classroom situation. They assisted each teacher in adapting the work to his or her needs.

Sound films, color slides, charts, and soil erosion demonstrations suitable for schools were in frequent use. Among the best films screened were *This Land of Ours* (Ethyl Corp.), *Realm of the Wild* and *Lifeblood of the Land* (U. S. Forest Service), *Trees for Tomorrow* (most State Forestry departments), *Clean Waters* (General Electric), and the old, but still magnificent and dramatic film, *The River*. While some film showings were held outdoors in connection with campfire programs most were given in the museum-headquarters which houses library, laboratory, and exhibits. Discussion of the use of each film followed its presentation.

Among the unusual exhibits are mural paintings, some by nationally known artists. They include marine life studies, the life of a fresh-water pond, adaptations of animals to winter, food chains and other diagrams showing interrelationships, and plant succession. Many "audience-participation" type exhibits are suitable for use in the classroom.

Forest conservation problems and the relation of plant succession to changes in wildlife populations are studied in the field. The giant sugar maple shown here once stood in a field, now is surrounded by a stand of young black birch and maple. Photo by Charles E. Mohr, National Audubon Society.

Students live in *Mead House*, an attractive colonial dwelling. A spacious dining hall and recreation center, in a rebuilt barn, is just a few steps away.

This summer's program includes several types of sessions:

Two-week Conservation Courses

June 27–July 9, July 25–Aug. 6, Aug. 15–27

Biology teachers and students, and Frank C. Edminster, Regional Biologist, U. S. Soil Conservation Service, watch a demonstration of soil erosion with the use of standardized "run-off" boxes, each 1/10,000 of an acre in size. Photo by Charles E. Mohr, National Audubon Society.

Two-week Nature Leaders Training Course

June 13–June 25

Five-day Courses (for Girl Scout and Campfire Girl leaders).

July 11–15

August 9–13 (for representatives of affiliated Audubon Societies—by invitation only).

Scholarships are being provided in many communities by garden and woman's clubs and conservation groups. For information regarding courses write to: The National Audubon Society, 1000 Fifth Avenue, New York 28, N. Y.

The Role of the Health Co-ordinator*

MOREY R. FIELDS
School of Education, New York University

Good health, as the optimal functioning of the physical, mental, social and emotional aspects of the individual is basic for life; it is the foundation for the existence of towns and villages, states, nations, the world. Ill health has been cited as one of the major factors leading to crime, violence and war. There is evidence that ill health has contributed to the development of fascist societies. Democracy, in order to provide the fullest measures of constructive achievement, must have an absence, as nearly as practicable, of sick bodies and minds of its citizenry. Thus, in this nation, good health is as much a basic right of the individual as are those rights of worship, of expression, of use of the printed word.

Transcending all other needs, that of good health must have educational re-emphasis if we are to preserve our primary heritages. Recognition of this latter premise has been afforded by our leading educators today. On the other hand, while a considerable number of words, written and spoken, have given credence to the importance of good health, progress in the prevention and eradication of illness through education in the public schools has been slow; this may be partly explained by the fact that while there is agreement as to the need for health education in the public schools, few are honestly endeavoring to carry

* Address before The National Association of Biology Teachers at Washington, D. C., December 29, 1948.

out these concepts to the fullest extent.

If the school health program is to function desirably to the total development of the student, that individual must be literally bombarded from all sides with every technique available at every possible moment by desirable leadership throughout the school years. Considerable controversy has been raging over who has prior rights to leadership in the school health program. Since good health of the student is the base for education, every one with whom the student has contact during his school life has a responsibility in his development;—all such individuals have prior rights and should exercise those prerogatives. This, then denotes integration, which, in turn, implies the need for co-ordination of all health program efforts in behalf of the student. Finally, there must be a trained person, the school health co-ordinator, to bring together all contributions and relationships of the school health program to the individual for the utmost completeness and satisfaction. With this co-ordinator rests the leadership for the school health program.

There are well-defined values to school health co-ordination: health needs and interests of students are more clearly defined and met, overlapping of activities and needless repetition in the program are reduced to a minimum, responsibility for a successful program is vested in skilled persons, and there is greater assurance of cooperation from those who can contribute to the growth of the individual. Further values accrue in that all aspects of school health activities focus on individuals in a concentration of power that insures measures of success. Gathering all these facts overcomes isolated community efforts, and engages the total environment for the promotion of good health in the individual.

The health co-ordinator functions primarily in an advisory manner, yet he has direct duties, such as: development of the instruction phase of the school health program, organization of the school health council, conferences with teachers and counselors on health and behavior problems, planning for health services, supervision of records, and evaluation of activities. One basic responsibility of the co-ordinator is that of constant planning. Continuity of activity in the school-health program is necessary for success; to that end the trained health co-ordinator can supply dynamic leadership. Avoidance of the merging of agencies or groups, of subordination of interests, of authoritarian concepts can be accomplished through effective leaders. Co-ordination implies the need for working together and attempts to fill the gaps indicated above. Providing opportunities for agreement upon objectives, activities and responsibilities is the lot of the co-ordinator. This comes about through a clear understanding of what is to be done and a logical and acceptable appreciation of the capabilities of each individual and group.

Qualifications of the co-ordinator are the same as for any leader who must have the skill and personality of a real teacher and administrator. He must thoroughly know his field: objectives, testing, how to plan, how to campaign, how to organize. Success comes through diplomacy, conscientiousness, humor and firmness. The need for enthusiasm is apparent, for it is this characteristic that wins new followers for a cause. Above all, the health co-ordinator must be a super-salesman for he has to sell himself and his program to persons who are reluctant to recognize values because of vested interests, a fear of more work, and a suspiciousness that pervades some professional persons.

The health co-ordinator is an important and needed individual in the public

school today. If co-ordinator contributes in a major sense to the success of the school health program, then it follows that the co-ordinator is responsible for that success. Yet, this responsibility can only be effective if the skill of the leader is used in the most advantageous manner. Co-ordination is the essence of democracy; good health is the basic right of every citizen in this nation. Then, it is feasible that contributions to democracy can be made through improving the health of the child, by the activities of the co-ordinator in the school health programs.

ARTICLES OR ITEMS for fall publication should be submitted in plenty of time. Manuscripts for the October issue go to the printer about the 20th of July.

In connection with the serious illness and death of his father, the editor was out of Emporia for a considerable time just when the proof of the April issue and the dummy for the May issue should have gone to the printer. The editor therefore assumes the entire responsibility for the lateness of these two issues. We hope you will bear with us and look forward to a prompt and live October issue.

JOHN BREUKELMAN

Suggestions for Summer Work for Boys and Girls

DOROTHY MEIER
Hunter College of the City of New York

As the summer time approaches, boys and girls have an opportunity to become acquainted with plants and animals in their natural environment.

Here are a few suggestions of things that can easily be done, and while they are being done the students become more interested in the plants and animals with which they are working than they ever would in the laboratory. They are things that can be done by girl or boy scout groups, by groups at summer camps, or by boys and girls working alone or with their friends.

In the fields and woods butterflies may be caught, and the pressed specimens can be combined with pressed flowers or leaves of plants and milkweed floss to make beautiful pictures and trays.

Butterflies and moths for this use may be prepared in the way given below. If nets for catching the butterflies cannot be bought or borrowed from the class room, they may be made with a little help from parents or friends. To make the net, a stout wire may be curved to form a circle with the diameter of about a foot, and the ends fastened to a bamboo pole or an old broom handle. A bag of coarse cheesecloth may be sewed about the wire to form the net.

When the insects are caught, care must be taken in handling them as pressure on the wings removes the tiny colored scales that form the patterns on the wings.

The insects may be quickly killed by placing them in bottles for killing insects, which may be purchased from scientific supply houses, or they may be killed by placing a few drops of gasoline, from a small bottle carried by the collector, on the insect's abdomen.

The wings must be placed in the position in which they are to harden before the insect dries out. One way of doing this is to take two pieces of soft wood of

equal thickness and place both of them on a flat surface about one-fourth of an inch apart, or just far enough apart so that the body of the insect fits between them. The wings are placed in the desired position and pinned, if pinning seems necessary. After a few days the dried insects may be carefully placed in a covered box where they will be protected from dust. Crystals such as paradichlorobenzol, that will kill the insects that eat the bodies, should be placed with the dried specimens.

The flowers, ferns, or tree leaves that are used together with the butterflies in making the mounts may be pressed in the following way. Carefully place the leaf or flower between a single fold of thin paper, and put the folders between many layers of blotting paper or newspapers with weights on top. The newspapers should be changed frequently until the plant specimens are completely dried out.

It is not suggested that students press rare flowers, or try to make collections of pressed flowers, as too many of the rarer types are in danger of becoming extinct. But many common flowers, grasses, fern and tree leaves are beautiful when pressed and used for pictures, trays or tables.

Pictures may be made using the pressed butterflies and plant parts in this manner. A rectangular piece of glass, for example five by seven inches, and a piece of stiff cardboard the same size are needed. Pods of the milkweed plant, when collected just before they are ripe, will yield milkweed floss, which may be used as a thick, soft background material on which the pressed flowers or grasses may be placed. The butterflies may be grouped about the plant parts. A few crystals for killing moths should be placed in the floss about the butterflies. Gummed tape (passe partout) is fastened securely around the glass to hold it with the back and to serve as a frame. Gummed cloth hangers may be glued to the back so that the picture may be hung.

Inexpensive picture frames with glass and back may be purchased at the chain stores in every city, but there is satisfaction in making the entire picture if glass is available.

Trays fitted with glass bottoms may be decorated in the same manner.

Glass-topped tables may appear more interesting with a few pressed specimens of ferns, leaves, or flowers placed beneath the glass.

At the end of the long summer the girls and boys can look back on hours of interesting work. The beautiful mementoes which they can prepare will last indefinitely.

DETROIT BIOLOGY CLUB

Officers 1948–49

President: Clarence E. Altenburg, Highland Park Junior College

Vice-President: Vera Oehmke, Pershing High School, Detroit

Secretary: Mrs. Sophia Cone, Northern High School, Detroit

Treasurer: Miss Dorothy Tryon, Redford High School, Detroit

Program for 1948–49

September 18—Field Trip to Ferry-Morse Seed Farm at Rochester, Michigan.

October 19—Douglas T. Grubb, Michigan Wild Flowers. (Color Slides)

November 10—Discussion of High School Biology Text Books.

January 12—Dr. Reuben L. Kahn, Professor of Serology University of Michigan Medical School. (Universal Serologic Reaction in Health and Disease)

February 8—Arthur W. Andrews, Curator Coleoptera, University of Michigan. (Insects)

March 9—Earl Debus, Pershing High School, Detroit. (Color slides of Alaska)

April 5—Trip to Cranbrook Museum and

Cranbrook Institute of Science, Bloomfield Hills, Mich.

May 11—George M. Sutton, University of Michigan. (Why I like Eskimos)

May (latter part)—Student Camp-out, Walden Woods in Michigan.

Chairman of Program Committee, Alfred Povah, Denby High School, Detroit

Member of Program Committee, Helen Monroe, MacKenzie High School, Detroit

Summary of Dr. Kahn's talk, January 12, 1949

A new blood serum reaction, given by all human beings and animals tested thus far, was discussed by Dr. Reuben L. Kahn of the University of Michigan before the Detroit Biology Club. Because this serum reaction is a common manifestation in human beings and in animals, he refers to it as "universal serologic reaction."

The technique which elicits the universal reaction embodies the use of 1) a reagent (antigen) consisting of an extract of tissue lipids and 2) serial serum dilutions of salt concentrations ranging from 0 to 2.1 per cent NaCl. The appropriate use of the lipid reagent with the serial dilutions of serum, combined with incubation, leads to the formation of precipitates in certain serum dilutions and not in others. The results of the universal technique, when charted, thus consists of zones of precipitation side by side with zones of freedom from precipitation.

An outstanding feature of the universal reaction is that normal human beings give within limits distinctive serologic patterns. Also, the serologic pattern of any given human being apparently remains constant under conditions of health. Dr. Kahn is now investigating the changes in normal serologic patterns in human beings as a result of disease. He has noted such changes in syphilis, leprosy, malaria, and tuberculosis. He is also investigating the serologic patterns of different animals in health and disease.

Standards for Selecting Biological and Anatomical Models*

ARTHUR R. GIBSON
Oliver P. Morton School, Hammond, Indiana

Size

A model should be large enough to be seen from any place in the classroom; therefore it must be constructed on an enlarged scale, except for standard units which are faithful to the original.

Desirable License

A teaching situation may require the simplification of structures for beginners, or other deviation from actual form. License in design is permissible only when clarifying certain important points.

Workability

A model should be dissectible to a degree permitting the examination of structures and organs from every plane. Mechanical features should be provided to hold separate organs in position wherever this is desirable. Metal sleeves and pins should be machined to permit easy removal of parts and their return to position without damage.

Visibility

There should be a third-dimensional portrayal of anatomical structures wherever possible, including the finest structures, such as blood vessels and nerves. These should be enhanced by clean and contrasting colors which have carrying power.

* Reprinted by permission from the November 1948 issue of *Audio-Visual Guide.* This is one of eleven projects conducted by the Audio-Visual Research Committee of the Department of Secondary Teachers of the NEA.

Durable Construction

For classroom use desirable models are rich in detail, of sturdy construction, light in weight, immune to temperature changes, humidity, and insects. The molding compound should be free from any chemical or physical changes, such as oxidation and shrinkage after casting. Strong, internal reinforcement with fabrics should be augmented by the use of resinous substances. The resinous materials give a resilience to the cast which minimizes chipping. Pins and tubing must be securely anchored during the casting process.

Finish

Coloring must be done with lacquers and paints which bond readily with the cast and will not flake or peel. They should dry into a hard finish that will not crack or scratch. The model should be coated with a flat, waterproof finish. Such a surface eliminates glare, accentuates the third dimensional character of the model and color detail, and permits cleaning with soap and water.

Storage

Inexpensive covers made from a transparent plastic provide protection from dust and soot. More expensive storage facilities can be provided by wood or metal cabinets, preferably large enough to house related groups of materials.

Replacements

Cut-away-models—torso, eye, ear, etc. —are valuable instructional aids. Frequent handling may ultimately require some replacement of parts. This is possible when pin and tube attachments are standardized in the original pattern and subsequent casts.

Biology—1949 Model

JESSE V. MILLER
Manhasset High School, Manhasset, New York

Much of the biology taught in secondary schools today is the same as that taught twenty years ago. The passage of time does not necessarily make all *old* things obsolete, but neither does it make them indispensable. It seems to me there is no better time than the present to take an account of stock. Are we carrying merchandise on our biology shelves that should be replaced by new models?

Such an accounting has been in progress at Manhasset for several years, and me have emerged with a "new model" of constantly changing nature, which, like the new automobiles, works on the same principles as the old, but with far greater comfort to both students and teacher. This article is written with the hope that other Biology teachers will find in our experiences something helpful to them, even if that "something" be only added courage.

Guiding Principles

1. The word "biology" has come to have a rather definite meaning to each of us, derived in large measure from our own high school and college courses, as well as from the content of textbooks we have studied. This "mind-picture" of biology tends to limit us in our thinking, and we are almost sure to measure all proposed changes in terms of "is it good solid biology?". If it doesn't fit our pattern, we tend to dismiss it as "not biology" and therefore not within our realm.

2. This brings us to a newer concept of a teacher's job. Should we refuse to teach materials of a borderline nature because they do not fit our mold? The extent to which we can make changes will depend largely on our answer to this question.

3. There is nothing so useless as an unused fact, and nothing more easily forgotten. Functional biology, put to work immediately, grows and is not forgotten. It is more worthwhile to work for development of desirable attitudes, appreciations, and *functional* information than for the memorization of Latin and Greek vocabulary, much of which the average student will never use. We have found it worthwhile to ask, "will this be *really useful* to *most* of the students"? If it won't be used for five or ten years it will almost certainly be forgotten by then anyway, so why teach it at this time at all? Of course, students who are preparing to continue with advanced biology in college will need a different emphasis than those who will probably not continue biology beyond high school.

4. Are college teachers the logical ones to determine the changes to be made in our secondary school curriculum, or are the teachers in the secondary schools the more logical ones? If we refuse to take the initiative we can expect that the college teachers will do the job. They have the habit of writing books and putting their ideas into print, but high school teachers should be in a better position to understand the needs of their students.

5. Does your present biology course meet the *needs* of the children of your community, and the aims of general education? Are you helping your students to develop interests in *leisure-time* activities? The old zoology and botany courses in high schools did this. Are you providing education for social and civic competence, human relationships, self realization? Have you considered the special needs of the community in which you teach?

6. The students in our classes are capable of giving us valuable help in course revision. They are in an especially good position to pass judgment on *how interesting* a given unit was (after it has been taught); on the immediate value of a unit; and on how well it has been taught. They can suggest topics they would like to study, and topics they think might better be eliminated. The validity of their cooperation will depend partly on the proportion of students who concur in a suggestion, and perhaps even more on the "feeling" a teacher develops in the class. If enrollment in biology is on a voluntary basis a teacher can tell, at least to some extent, how successful students consider the course by the number who are willing to give up a year of their valuable time to it. A satisfied customer is the best advertisement. It must also not be forgotten that teachers differ in their ability to handle certain materials and techniques. It is probably better not to teach a unit than to teach it without enthusiasm or with obvious misgiving.

7. Because the State of New York excuses students who have passed a year of biology from the half year requirement in health and hygiene, the State expects all biology students to have had a thorough experience with the biology of health. Students consider this important, too, so there is no disagreement here except as to specific materials and teaching methods. At Manhasset we have largely substituted human beings for earthworms, grasshoppers, and frogs in our biology work. Classroom films provide us with dissections and other materials on higher mammals which are more like humans than anything we

could supply. There is no reason why students should not dissect the "lower" animals if they want to, but I question whether they should *have* to.

How the Course Has Been Developed

Emphasis is on topics directly usable to the student. Terminology is kept at a minimum. Anatomy is taught as it is *needed* to understand health principles. Diseases, ailments, and modern developments in the treatment of human ills are stressed. The *normal* process of respiration, circulation, nutrition, digestion, excretion, and chemical body control is followed in each case by *what can go wrong? and what can we do to prevent a breakdown.* Germ diseases are considered along with the systems affected. Those germ diseases which do not seem to fit a particular system are taken up toward the end of the health study, along with modern progress in curative and preventative medicine.

Manhasset is a suburban community. Most of the students' parents commute daily to New York City. The social life of the community is active and vigorous. Homes are well built, well cared for, and attractive. About 40% of our students complete their formal education with high school.

In a community of this kind one might expect children not to feel any great need for education in human relationships. With parents constantly in the "social swin" students might be expected to have received a thorough grounding at home. But this is not the case. Apparently students feel the social pressures even more in a social community, and their parents are not completely meeting their needs. In areas where there is less chance for practicing social psychology the need must be even greater.

Students at Manhasset consider "applied psychology" the most valuable part of the practical biology course. They ask for more and more each year. They want to know *how* the human brain works, how we learn, how personality can be developed and improved, how to apply psychology in getting along with people wherever they meet them. We sometimes have to "sell" to high school students the needs for evaluating our life-partners before our emotions suppress our logic. The divorce rate suggests that cupid is not handling the job very well alone. The health aspects of faulty vision, distressing past experiences, our present habits and interests and our mental gyrations are too obvious to require lengthy discussion in this article. However, all of these topics seem worth a somewhat lengthy discussion in the classroom.

An understanding of the heredity of human traits becomes necessary in order to better understand one's associates, and the implications of the choice of a mate with undesirable inheritance. This need comes out naturally time after time in the preceeding units. While the heredity of Mendel's peas is interesting from a scientific standpoint, it is of minor importance in the student mind when compared with human traits.

A community like Manhasset has a considerable interest in growing plants. Many of the parents raise flowers or vegetables as a hobby. An understanding of the principles of plant reproduction and growth is necessary for the greatest success in the cultivation of flowers or vegetables. High school students work with their parents on these hobby-projects. By studying modern methods they can increase their own feeling of importance and contribute on an intellectual as well as a physical plane. This is good, straight biology, but with a practical aspect not found in a textpook situation. We also find, in

a community like Manhasset, a wide variety of decorative plants used as landscaping around the homes. Many of our students cannot supply a name for the more common varieties, let alone the less common ones. This suggests other possibilities for administering to the needs of the community.

Manhasset bird life is interesting and varied. Repeated studies have demonstrated that the average high school student knows no more than five birds, and he isn't even sure of these. Many students look forward to our short, yearly, out-of-door bird studies.

One other unit is studied each year. The choice of this topic depends on the interests of the current group, and the response of last year's classes to their choice.

We do not *rush* any unit or topic. We try to terminate each study *before* students tire of it.

It is sometimes amusing to have a person ask, "May I have a copy of your course?"—as though the outline would supply a magic answer to his ills. The biology you develop for *your* community should fit your *community*. *Use* any of the suggested principles that fit your particular problem, substitute better ones for those that do not fit; and reject those you cannot take into your thinking and believe sincerely.

Should "A National Science Day" Or "A National Science Week" Be Organized And Observed by Scientists In The United States?

The National Science Teachers Association is studying the advisability of putting the following proposal into effect: "Shall the N.S.T.A. take the lead in proposing and sponsoring a science public relations program to be observed during 'A National Science Day' or 'A National Science Week' in the United States?"

This program was presented to the Association with the view to accomplishing the following major objectives:

1. To promote science and the science professions on a national basis.
2. To enable the scientists to become better acquainted with each other and one another's work.
3. To honor the workers in the various fields of science.
4. To acquaint laymen with the contributions of pure and applied science. Too frequently they learn of science only in connection with atomic bombs and other destructive agents. They should know also that scientific minds and laboratories are constantly at work devising and producing for their comfort and health such items as pop-up toasters, thermostats, deep-freeze units, television, and penicillin. The better acquainted laymen become with science, the more value it has to them, and the less biased they are toward it and society.

These questions may be asked. 1. To whom should responsibility be delegated for this program? What promotional aids would be available to teachers? Obviously, the program's success would depend upon inclusion and cooperation of all science organizations. Ultimately, the success of this project would rest upon the individual science teachers throughout the nation. Pamphlets describing programs suitable for class room use, science assemblies, night science meetings, service clubs, womens clubs, etc., could be made available. Other avenues for observing such an occasion would include science articles in local newspapers by teachers and other technically trained men and women in the community, radio networks, and news releases.

We, who work in science, are aware that the record of scientific achievement is a commendable one. Few professions offer a comparable galaxy of notable men and women, both past and present, who have and are contributing to man's well being. Why, then, do not we science teachers pay honor to our

profession and its workers and, at the same time, direct our efforts toward increasing an understanding of the practicability of scientific methods and products to laymen.

A committee has been appointed by N.S.T.A. to determine the feasibility of this program, and to submit a report at the Boston meeting in July, 1949.

To bring this matter to the science teachers over the Nation, editors of science journals have been invited to assist the committee by giving magazine space to this article and questionnaire. Specifically, the committee wishes to learn the attitude of science teachers in the United States regarding this project. *Every reader of this Journal interested in Science Education from kindergarten through the university is, therefore, urged to contact a member of the committee and express his or her opinion regarding the desirability of one of the following:* 1. A National Science Day. 2. A National Science Week. 3. Would you assist by supporting and promoting such a program in your local school system and community? The committee members are as follows:

1. Dr. Earl R. Glenn
   State Teachers College
   Upper Montclair, New Jersey
2. Dr. Walter S. Lapp
   724 Derstine Avenue
   Lansdale, Pa.
3. Mr. Lee R. Yothers, Chairman
   Rahway High School
   Rahway, New Jersey

Notes & News

INDUSTRIAL MYCOLOGY is the subject of a short course to be given at Purdue University during the summer of 1949. The lecture subjects and corresponding laboratory subjects include Micrometry, Ascomycetous Molds, Yeasts, Aspergilli, Penicillia, Imperfect Molds, Economic Importance and the like. During the afternoons a related course in the Physiology of the Fungi will be offered. Several lectures on Medical Mycology and related topics will be given during three or four evenings. Further information may be obtained from Merle M. McClure, Technical Extension Division, Purdue University, Lafayette, Indiana.

ALLIED YOUTH, what's it all about? This question has come to the editorial desk of ABT several times recently. *Allied Youth* is a national educational association for high school students, which has as its central interest a program of alcohol education and alcohol-free recreation. It is not affiliated with any other of the major educational and scientific organizations, but often works in cooperation with several of them. Information concerning the organization may be obtained by writing Allied Youth, 1709 M. Street, NW, Washington 6, D. C.

BIOLOGY LABORATORIES

LABEL NUMBERS. Out of one laboratory suggestion file comes this one. Boxes containing microscope slides can be returned to their places easily if both the box and the space are numbered, with a duplicate number. A calendar will supply the necessary numbers, but I prefer to have a student do a neat job of printing on a gummed label. You can select a student able to do this by observing the neatness of his note book.

ABILITY SEARCH. On the students' name cards I have them answer a few questions. One is—"Do you enjoy working at a bench?" Many of them answer "Yes." "Do you like to do precision work at a bench?" Four or five answer "Yes" to this question. When ever a special job comes up, e.g. pricking out seedlings for transplanting, honing bone or tooth, operating projectors or the like the precision boys get the job. Those that relish working at a bench but not precision work get the hammer and saw repair jobs. Those that do not care for this get the garden trowel and hoe in the spring.

CORKS AND LIDS. This one comes from a dental journal. Bottles containing acid that tends to rust or corrode ordinary corks and lids from the fumes can be protected. Pour a few c.c. of mineral oil on the surface of the acid in the bottle. This prevents fumes from reaching the cork or lid.

THE BIWEEKLY MAGAZINE *Seed World* is not recommended for biology study but it does have a very attractive cover. Before disposing of several volumes in a waste paper drive I removed the covers and used them for room decoration. These were stapled to the cork bulletin boards just below the top trim, on two sides of the room.

A STAPLER is a handy piece of teaching equipment to have. If you use thumb tacks and turn your back the four tacks melt or perhaps reappear on some one's drawing board. No one bothers staples. Better yet, get a stapler for each member of the department.

CONVERSATION PIECE. As a biology teacher you are unique if you do not get at least one question during the summer from a friend on the care of lawns. Here are some facts to start the conversation or to aid in the answer of questions. The best time to start a new lawn or renovate an old one is in early fall. The fall start and spring spurt carries it thru the hot summer. Correct contours before seeding. Use good seed. Reseed in fall for shady areas; these grasses get established before leaves of trees come out in spring.

TURF AND LAWN CARE. This is the name of a unit I have in my biology course. The problems are: Lawn Location, Contour, etc.; Conditioning Subsoil and Top Soil, Seeding, Grass Seed Formulas (mixtures), Maintenance, Creeping Bent, Pests and Diseases, Lawn and Turf Weeds, Chemical Control of Lawn Weeds. We spend about five weeks on this unit. I give the students this unit because many of them will own their own homes some day.

TREES AND SHRUBS is another unit I give the boys. They generally vote on which they wish to study. They have a choice between the lawn or tree unit. They voted about eighty per cent for *Turf and Lawns* this year. The problems I have in this unit are: Trees and Shrubs in Landscape Design, Transplanting, Tree Pruning Technique, Evergreens, Evergreen Varieties (Types), Deciduous Trees, Varieties of Deciduous Trees, Shrubs, Shrub Varieties, Climbing Vines and Hedges, and Dwarf Trees.

TRANSPLANTING. Last spring 1948 the boys transplanted twelve trees to the campus from the nursery. They were trees ten to eighteen feet high. They had just studied the unit on Trees and Shrubs.

ADDITIONAL UNITS which I present when the spirit moves me are: *Hydrophonics; Insects and Diseases of Plants; Plant Propagation; Plant Structure and Function; Greenhouse Construction and Maintenance; Greenhouse Techniques; Greenhouse Crops; Bulbs; Gardening.* Since there were no texts on these subjects I wrote the material for the classes. If you are interested I would be glad to furnish you with more details.

Send in your biology suggestions to the oldest living fossil. I will answer your communication. Address 5061 N. St. Louis Avenue, Chicago 25.

Reviews

OAKES, MERVIN E. *Children's Explanation of Natural Phenomena.* Teachers College, Columbia University: Contributions to Education No. 926. New York. vi + 151 pp. 1947. $2.35.

Teachers concerned with the need of youth for education in the procedures of scientific thinking know that these habits and attitudes are often set during the early school years. Elementary teaching bears much of the responsibility for encouraging curiosity as to causality, accuracy in observation, and logic in drawing conclusions. In this investigation, Dr. Oakes has demonstrated that children do seek logical and naturalistic explanations of phenomena when opportunity permits, and are willing to alter hypotheses when the results of experiments are available for a correct interpretation. A similar experiment with a group of elementary-school teachers, however, indicated

that they, after once having put forth an erroneous explanation, are far less likely than their pupils to alter a hypothesis in the face of contrary experimental evidence! This finding alone, if valid with a larger selection of teachers, has a multitude of implications as to the fate of the scientific attitude in the process of developing a pedagogical attitude.

Mr. Oakes lists questions and simple science experiments presented in his study, together with a classification of some basic science concepts as to difficulty. There is also a convenient tabulation of types of answers given to his questions. The book is of especial value to those interested in the problems of elementary school science, but we all can benefit from a review of the development of the thought patterns basic to scientific work.

RUTH S. STEIN,
Los Angeles City College,
Los Angeles, California

SMITH, ELLA THEA. *Exploring Biology.* 3rd ed. Harcourt, Brace and Company, New York. viii + 607 pp. illus. 1949. $3.98.

The reviewer has had the opportunity to see *Exploring Biology* grow up. One is tempted to explore, upon first opening the book, by a reproduction of one of natures grandest scenes found inside its covers. The new third edition retains the unit-problem approach. From the outset the author challenges the student to the realization that Biology is a practical subject in a changing world. A statement of pertinent recent advances introduces each unit. Important words are italicized and marked for ease of pronounciation. There are 364 well chosen illustrations. The phlogenetic "trees" are especially valuable in aiding the student to see relationships in plants and animals. At the end of each problem a section is devoted to the Biology notebook, which includes directions for laboratory work; a vocabulary of significant words pertaining to the unit; a list of thought questions; and references for suggested readings. A supplementary manual is unnecessary. The book is appended by a "classroom library" which lists numerous titles of magazines, government publications, pamphlets, and books suitable for supplementary reading. A paragraph devoted to the listing of biological literature—great literary masterpieces—enhance the aesthetic value of the book. The book is the most accurate and the least teliological that the writer has been privileged to examine in recent years. The author has the unusual ability to simplify biological information without sacrificing accuracy. Whether algae and fungi are classes; whether the peony is a plant organ; or whether all desert plants are xerophytes —these and more fundamental problems will surely be solved by enterprising students as they explore the realm of Bios.

J. A. TRENT,
Oklahoma Baptist University,
Shawnee, Oklahoma

KNIGHT, R. L., *Dictionary of Genetics:* Including Terms used in Cytology, Animal Breeding and Evolution. Chronica Botanica Co., Waltham, Mass.; Stechert-Hafner, Inc., New York City. ix + 183 pp. 1948. $4.50.

This book is the first attempt to bring together in the English language a comprehensive list of terms used in genetics, cytology, animal breeding, and evolution. The nearest approach to it heretofore has been in glossaries in one or the other of the special fields, best exemplified in Wilson's classical book on The Cell in Development and Heredity. The present work has drawn upon the leading American and British sources, including numerous books and journals. The author is Senior Economic Geneticist, Empire Cotton Growing Corporation and Sudan Government. It should prove valuable to the reader who is not an expert in any of the branches of biology it covers. The author hopes that it will help to discourage biologists from further unnecessarily increasing terminology, particularly from coining new words where suitable terms already exist. Biology suffers more from such excess verbiage than most branches of science.

The definitions are clear and concise; pronunciations and derivations are not given. Twelve pages of appendices are a valuable feature of the book. These include numer-

ous useful statistical formulae and tables, including a table on the distribution of chi square; a list of International Rules for Symbolizing Genes and Chromosome Aberrations; and a table of Distances Recommended to Avoid Seed Contamination. The book is attractively made up and is printed in clear type on a heavy grade of paper. It should be on the shelves of every high school, junior college, and college library wherever a serious course in biology is given; for it covers a broad field in which in recent decades some of the most interesting and significant discoveries in the whole science of biology have been made. The teacher of biology or of any of its branches will want a copy on his desk.

EDWARD C. COLIN,
Chicago Teachers College,
Chicago, Illinois

TANNER, FRED WILBUR, TANNER, FRED WILBUR, JR. *Bacteriology—A Textbook of Microorganisms.* Fourth ed. John Wiley and Sons., New York. 625 pp. 137 illus. 1948. $4.50.

This text surveys the field of microorganisms, including molds, yeasts, viruses, and protozoa, with major emphasis on bacteria. Equal stress is placed on the pathogenic and non-pathogenic forms. An excellent historical background is presented with further chapters covering the more important recent developments and theories in the field. Thirty one chapters and topical subjects cover such material as: history and early development; relationship and general principles of plants and animals; ultramicroscopic forms of life; morphology of bacteria; nomenclature and classifications; related microorganisms; physical and chemical agents; growth and nutrition; bacterial cycles; industrial and food bacteria; sanitation; disease, transmission and infection, bacterial actions; immunities; and plant diseases.

The authors use other sources frequently and give these sources at the bottom of each page. Supplementing each chapter is a selected list of references. Subheadings are used for main topics and important points are italicized. The book contains a classification and key for the identification of organism of the Class Schizomycetes from Bergey, a classification of yeasts, and a chart for forty common communicable diseases with etiologic agents, source of infection, mode of transmission, incubation period, immunity and control. Of the many illustrations used, about half are drawings and the other half are photopraghs; many of the photographs have been poorly reproduced. A striking feature is the appendix which lists the more important publications of bacteriological literature including text books, abstracts, and journals and periodicals. A brief glossary is included plus a complete fifteen page index.

The material concerning ultramicroscopic speculations and relationships of plants and animals is well summarized and written to produce further thought. The presentations of actual disease case histories adds color to the content. By the material being presented in a stimulating manner and the minimization of technical terminology, the authors have given to beginning students of bacteriology an excellent study book that lacks the "coldness" of many text books.

RUTH E. GRIFFITH,
The State College of Washington,
Pullman, Washington

HAUPT, ARTHUR W. *Laboratory Manual of Elementary Botany.* 2nd ed. McGraw-Hill Book Company, Inc., New York. x + 79 pp. No. illus. 1946. $1.25.

This elementary botany laboratory manual for college use is a revision, with some minor changes and additions, of the author's 1939 edition. Its 116 more or less independent exercises complete a full year's course; with the exception of a few, each exercise could probably be completed in a laboratory period of two hours. A listing of needed supplies appears in the introduction, together with directions for making drawings and observational notes. These directions are sufficiently general for adaptability to a department's individual routine. Concise and complete directions are given for the care and use of a microscope; however, but one practice exercise is outlined. More practice exercises might well be included to prepare students for the rather detailed microscope work which follows.

Most of the exercises call for readily obtainable materials and relatively simple and inexpensive apparatus.

The vocabulary seems at times unnecessarily technical for beginners; however, most of the scientific terms and label names are emphasized in the text matter. Very little descriptive material is included, and no illustrations. Some thought-provoking questions are proposed, but no problems are included which involve practice in scientific thinking or which might provoke animated class discussion. For a laboratory outline of the older, more conservative, and formalized type, this manual is well written and carefully organized. Although adaptable for general use, it could be used perhaps most effectively with the author's textbook, *An Introduction to Botany.*

B. Bernarr Vance,
The Department of Biology,
The University of Dayton

Guilliermond, Alexandre, and Atkinson, Lenette R. *The Cytoplasm of the Plant Cell.* Second printing. Chronica Botanica Company, Waltham, Mass., & Stechert-Hafner, Inc., New York. x + 246 pp. illus. 1941. $5.00.

A thorough though condensed presentation of the present knowledge relative to the cytoplasm of the plant cell. The true nature of the chondriosomes and of other parts of the cytoplasms are discussed by Professor Guilliermond in a most complete and authoritative manner. Though the manuscript was written toward the end of Guilliermond's active career it shows throughout the book a keen awareness of the importance of the recent advances in cytology. This exhaustive treatise on the highly complex nature of cytoplasm was written by an expert who knew how to impart his knowledge in relatively simple language. Mrs. Atkinson translated the manuscript from the French into most understandable English, and has further contributed to the excellence of the book by her arrangement of the subject matter. Though this book contains little that is of direct application in the high school classroom, it is invaluable to teachers who wish to secure the knowledge and background which are vital to a dynamic teacher of biology.

Brother H. Charles, F.S.C.,
St. Mary's College,
Winona, Minnesota

Grant, Charlotte L., Cady, H. Keith, and Neal, Nathan A. *American High School Biology,* Harper and Brothers Publishers, New York. xiii + 888 pp. illus. 1948.

This book can be recommended as a readable, up-to-date and useful high school biology textbook. The authors have approached the study of the basic principles of biology by relating them adequately to the student's own experiences. They have made a judicious selection of material from the vast array of biological information and presented this in terms that can be understood and appreciated by students at the high school level.

The method employed in presenting the student with the organization of living things into groups without resorting to the usual long and technical description of phyla and divisions should be a useful approach for students at the high school level. There are several chapters including new and pertinent information not always found in high school biology texts. These include: "Organic Diseases Today," "Body Defenses and Drug Allies," "Plants and Animals in Drugs and Medicines," and "Occupations in Biology." The emphasis on conservatism in many places throughout the book is a progressive feature.

Some of the chapter titles may be misleading if not properly interpreted by the student or teacher. For example, the chapter on "Food Comes From the Soil," while giving an interesting account of the nature and importance of the soil, does not relate the equally important factors of energy from light, and CO_2 from the atmosphere to the source of food. It is true that these relationships are brought out in a later chapter. However, if the student has already formed the concept that food comes from the soil, it may be difficult to reorient his thinking to include these other factors of fundamental importance. Another chapter title, "Stems and Roots Store Food," is one which seems poorly adapted to the content of the chapter.

For the most part balance of space devoted to various subjects has been accomplished; however, the lack of discussion regarding helpful bacteria as compared to harmful bacteria and the almost complete omission of discussion of the organic cycle in nature should be noted.

Excellent illustrations throughout the book, references to visual aids, usable questions at the end of chapters, a useful bibliography and glossary at the end of the book, and many progressive features of the text outweigh possible criticisms. The reviewer recommends this book for serious consideration to any American high school biology teacher.

Addison Lee,
University of Texas,
Austin, Texas

Wolf, Frederick A. and Frederick T. *The Fungi.* John Wiley & Sons, Inc., New York. Vol. I, vii + 438 pp., 1947. Price $6.00. Vol. II, vii + 538 pp., 1947. Price $6.50.

Fungi, in two volumes, is a scholarly treatise on the morphology, taxonomy and the activities and natural economy of fungi. An interesting history of mycology introduces Volume I. A welcome feature of the first volume, for teachers and students alike, is found in chapter two which is devoted to the isolation and cultivation of fungi, followed by classification and taxonomy in chapter three. Information on some of the lesser known families, which only advanced students would have occasion to use, has been omitted, as well as material on the lichens. The literature cited at the end of each chapter is adequate and will furnish the serious student with ample reference material.

Volume I serves as sort of an introduction to fungi while Volume II treats of the activities of fungi with the emphasis on metabolism and reproduction. In this most timely contribution to the study of fungi the authors have departed from the traditional taxonomic aspects to emphasize the physiological and ecological aspects, even though they do not purport that Volume II is a well-rounded physiology and ecology of fungi.

Both books are intended as reference and text books. Since most readers of "The American Biology Teacher" are teachers in our high schools it might be stated that these volumes will be of help to those teachers who have had some special work in mycology. The books are for college level and are too technical for general use as high school references.

Melvin A. Hintz,
South Milwaukee High School,
South Milwaukee, Wisconsin

Ross, Herbert H. *A Textbook of Entomology.* John Wiley & Sons. New York. ix + 532 pp. 439 illus. 1948. $6.00.

Within the compass of this new textbook, Professor Ross has succeeded in presenting the basic principles of entomology. Beginning with a historical approach, the author traces the genesis and growth of this special science in our continent. Many of the pioneer workers in this field, together with their contributions, are brought to the reader's attention. Following this is a concise comparison of the Arthropod classes, including a brief account of the Onychophora. Selected representatives from these groups are figured. One chapter each is devoted to the external and the internal insect anatomy. The physiology of organs, and also the life cycle of these animals is clearly presented. The next portion of the text discusses and illustrates the basic structures, functions, and characteristics of the orders of insects in North America. One chapter deals with the geological background of insects. This important information will enable students to compound existing species with their affinities to prehistoric ones. The ecological aspect of this work is especially well done. Here we learn of the biological and physical combination of factors and their degree of intensities, which are favorably or unfavorably interrelated with the insects and their environment. The final chapter gives an account of insect damage and effective methods of control. The discussion includes both the new insecticides and those which have been standard for years.

This reviewer is impressed with the first edition of this textbook. It is a significant contribution which, because of its logical or-

ganization and authoritative presentation, will be welcomed by beginning entomology students. Supplementary material will be needed for those more advanced in the study. The drawings, graphs, pictures, and charts are profuse in number and are excellent from a technical standpoint. This feature alone will do much to popularize the book. The author offers this word of caution regarding the keys to orders and families, "They are designed to accomodate only common members of common families and hence are far from complete."

LEE R. YOTHERS,
Rahway High School,
Rahway, New Jersey

FILMS

ANTS

This film depicts four different types of ants, their activities, and the kinds of nests they build. The 16mm. sound black and white one-reel picture, made specifically for the middle grades and junior and senior high schools, makes clear the basic similarities among all types of ants by comparing and contrasting the activities of different types of ant communities. Mound builder ants, black ants, household ants and carpenter ants are shown, the life cycle of the carpenter ant in detail. This includes such activities as a queen laying eggs, workers caring for pupae, a female pupa emerging from her cocoon, and preparation for the mating flight.

The collaborator for "Ants" is Dr. Arthur C. Cole, Jr., a member of the Department of Zoology and Entomology at the University of Tennessee since 1937. The film may be obtained for sale or rental from Encyclopaedia Britannica Films Inc., Wilmette, Illinois. Its sale price is $45.

THE CELL—STRUCTIONAL UNIT OF LIFE (One reel, sound, color or black-and-white). Here, through Coronet's micro-photography, the living, simple cell is authentically presented. Students actually see the moving, living protoplasm in a leaf cell . . . see amoeba taking food, growing, dividing . . . become familiar with differences in the structure of the cell according to its function within the entire organism. This vivid film unforgettably teaches the basic relationship of our own living bodies to other living organisms. (Intermediate, Junior High, Senior High).

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The entire Staff List will be found in the February and October issues.

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Manuscripts for publication in THE AMERICAN BIOLOGY TEACHER should be typewritten, on one side only, on standard white paper, $8\frac{1}{2} \times 11$ inch size, with a margin of at least an inch on all sides. The writer should keep a carbon copy for reference and as insurance against loss of the original in transit.

Articles are scheduled for publication in approximately the order of acceptance of the manuscripts. Generally the journal is tentatively arranged about three or four issues ahead, and there are under consideration at any time enough manuscripts for about two or three more issues. Some space is of course allowed for news items and articles of a seasonal nature. On the average, a manuscript submitted this month may expect to find its way into print, if it is accepted promptly, in about October or November. Many seasonal papers have to be postponed an entire year, simply because the author has not allowed the necessary four to six months that intervenes between acceptance and publication.

For details concerning titling, headings, references, illustrations, etc., consult *Preparation of Manuscripts for Publication*, which appeared in the October, 1943, issue of THE AMERICAN BIOLOGY TEACHER. A limited number of reprints is still available; copies may be obtained from the editor.

Manuscripts may be sent to the editor-in-chief or to any one of the associate editors. A complete list of the latter appears in each October and February issue.

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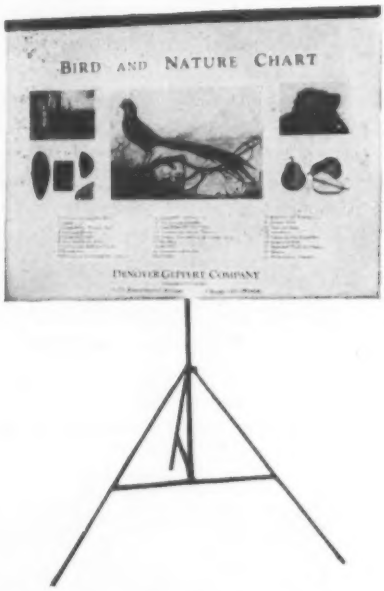

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